D/103/450.235 450.23

HALLIBURTON NUS
Environmental Corporation

INTERNAL CORRESPONDENCE

C-49-01-92-81

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SUBJECT: SOLIDIFICATION OF THE TRASH MIXTURE - REV. NO. 2 (TEST COMPLETED 1/19/92)

1.0 Purpose

The goal of this experiment was to determine the effect spiked trash will have on the final stabilized product at an initial mix of 1:2:3 (water:cement:aggregate).

Trash is defined as the pallets and plastic ground to a minus ten mesh sieve size.

Mix Date: 12/12/91

2.0 Procedure

Trash Preparation:

Trash was delivered as a wet mixture and allowed to completely air dry at room temperature. A spiking solution was prepared for the trash to simulate actual conditions. The following concentrations were added to 3.0L of each of the following ponds:

3L 207C-Pond Water	3L 207BC-Pond Water
10.5 mg/l Hg	10.5 mg/L Hg
2726 mg/L Cd	2726 mg/L Cd
2978 mg/L Cr	2978 mg/L Cr
476 mg/L Ni	476 mg/L Ni
230 mg/L Pb	230 mg/L Pb
84 mg/L Ag	84 mg/L Ag

The air dried trash was allowed to adsorb the spiking solution for 14 hrs. The spiked trash was then Buchner filtered to remove all free water.

Mix Preparation:

Three mixes were prepared in a 1:2:3 (water:cement:aggregate) ratio with the aggregate varied as follows:

Mix 1: 100% sand
Mix 2: 92% sand and 8% 207BC spiked trash
Mix 3: 92% sand and 8% 207C spiked trash

Lime was added to each mix prior to cement addition to achieve a pH of 11. The mixes were combined in a Hobart mixer and mixed for 5 min. All cylinders were placed in a curing cooler to ensure constant temperature and humidity.

Each mix produced 12 cylinders which were analyzed as follows:

1 cylinder - 7 day UCS
1 cylinder - 7 day TCLP
2 cylinders - 7 day cure wet/dry cycle and final UCS
2 cylinders - 7 day cure freeze/thaw cycle and final UCS
1 cylinder - 28 day USC
1 cylinder - 28 day TCLP
2 cylinders - 28 day cure wet/dry cycle and final UCS
2 cylinders - 28 day cure freeze/thaw cycle and final UCS

The testing procedures for the cylinders followed ASTM methods. Wet/dry testing followed ASTM D-559-82, freeze/thaw testing follows ASTM D-560-82, and UCS testing followed ASTM C39-86.

Results

After 7 days of curing six of the twelve cylinder molds were removed and casts appeared in good condition. The three separate mixes all achieved greater than 600 psi UCS (unconfined compressive strength) after 7 days curing. The TCLP results from the 7-day cure are shown in Table 2-1 and the 28-day cure results are shown in Table 2-2.

The freeze/thaw and wet/dry samples all performed well and remained in good condition after 24 days of cycling. The USC results from the volume and moisture specimens, after cycling, all achieved greater than 600 psi UCS. The 28 day cure durability testing was not completed as the 7-day cure specimens passed all parameters.

3.0 Conclusions

All results and observations indicate that the spiked trash mixes performed as well as the 100% sand control mix for durability and strength. The 28-day cure TCLP results failed for chromium.

This is not believed to be a major concern. Analytes of concern were spike at average values found in pondcrete. Since chromium was felt to be a problem analyte for leachability, the amount spiked was twice that of the average amount found in pondcrete. This increased amount of spiked chromium was a safety factor for the CSS formulation. Treatability studies for the actual waste forms will thoughly evaluate the leachability of the metals. Failures during the treatability will be corrected by the addition of more lime and/or ferrous sulfate addition.

TABLE 2-1
7-DAY CURE TCLP RESULTS (mg/L)

Compound	Trash Mix #1	Trash Mix #2	Trash Mix #3	Toxicity Characteristic Standard	Nonwastewater LDR Standard
Arsenic	0.16	<0.06	<0.06	5.0	---
Barium	0.67	0.46	0.57	100.0	---
Cadmium	<0.005	<0.005	<0.005	1.0	0.066
Chromium	0.02	3.3	4.6	5.0	5.2
Lead	<0.02	<0.02	<0.02	5.0	0.51
Mercury	<0.00008	<0.00008	0.00066	0.2	---
Selenium	<0.08	<0.8	<0.8	1.0	---
Silver	<0.003	<0.003	<0.003	5.0	0.072
Nickel	<0.03	0.03	0.04	---	0.32
Iron	0.029	0.01	<0.008	---	---
Aluminum	0.32	<0.09	<0.009	---	---
Calcium	950E	3100E	3600	---	---
Magnesium	0.06	9.9	16	---	---
pH after TCLP extn.	12.1	10.3	9.9	---	---

NOTE: E-Serial dilution result did not agree with the original result within 10%. Matrix interference should be suspected.

TABLE 2-2
28-DAY CURE TCLP RESULTS (mg/L)

Compound	Trash Mix #1	Trash Mix #2	Trash Mix #3	Toxicity Characteristic Standard	Nonwastewater LDR Standard
Arsenic	<0.06	<0.06	<0.06	5.0	---
Barium	0.706	0.556	0.667	100.0	---
Cadmium	<0.005	0.0050	0.0220	1.0	0.066
Chromium	0.281	3.64	5.23	5.0	5.2
Lead	0.195	0.0620	0.0360	5.0	0.51
Mercury	<0.00008	<0.00008	<0.00008	0.2	---
Selenium	<0.08	<0.08	<0.08	1.0	---
Silver	<0.003	<0.003	<0.003	5.0	0.072
Nickel	<0.03	0.0730	0.106	---	0.32
Iron	<0.008	<0.008	<0.008	---	---
Aluminum	<0.09	<0.09	<0.09	---	---
Calcium	3810	3580	3680	---	---
Magnesium	4.79	22.8	23.2	---	---
pH after TCLP extn.	10.5	9.4	9.1	---	---